SCIENCE NEWS-LETTER

The Weekly Summary of Current Science

A SCIENCE SERVICE PUBLICATION

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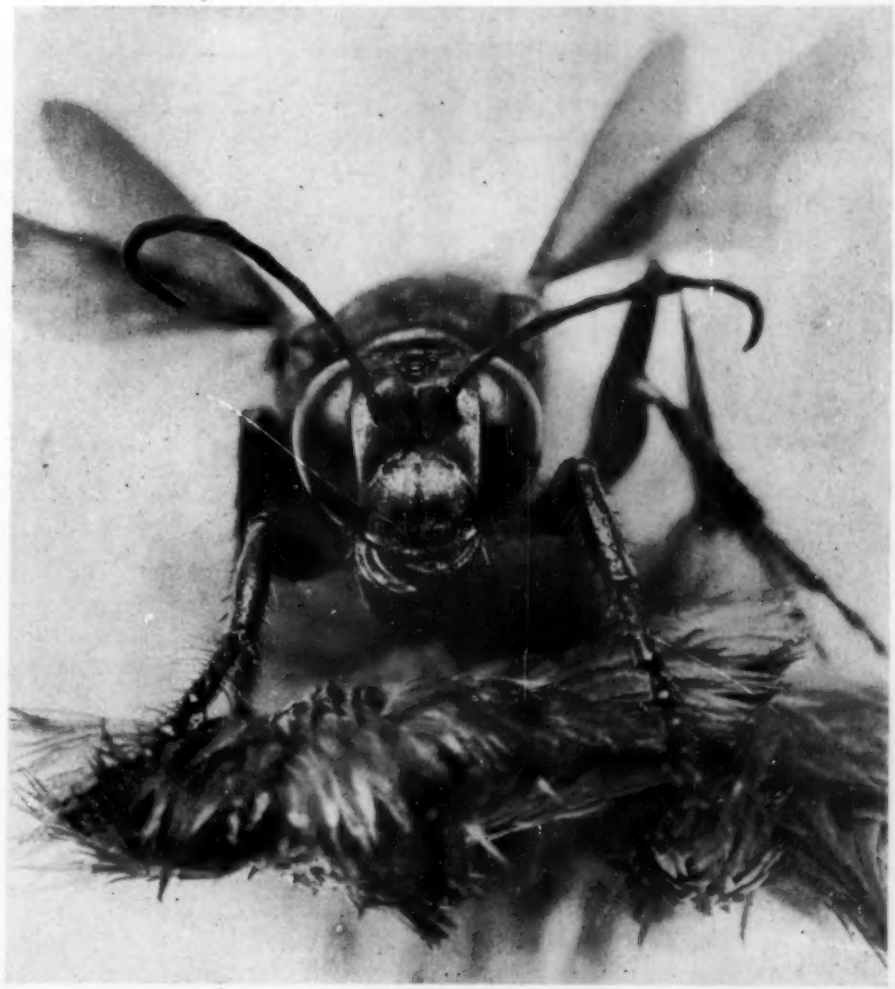

FACE TO FACE WITH A WASP

They Really Have Personality

(*See page* 354)

Vol. XIII *No. 374*

Phosgene Necessary German Chemical

Chemistry

When a tank of phosgene gas exploded near Hamburg and felled hundreds, there were querying echoes on this side of the Atlantic. For phosgene is the most effective of the deadly lethal war gases and the treaty of Versailles specifically prohibits the manufacture of poisonous gases in Germany.

How, then, does it happen that there is phosgene in Hamburg? Are tales of war preparation in Germany true? The chemist has a better explanation. Despite the treaty, chemical production demands that poison gases must be manufactured. Phosgene has not only been manufactured in Germany since the war, but considerable quantities have been shipped to America. Chemically phosgene is one part carbon, one part oxygen and two parts chlorine. It is the raw material for some dyes, particularly crystal violet, also used as an antiseptic. It is also used in the manufacture of some chemical solvents and several American chemical plants make it and utilize it for this purpose.

The phosgene explosion is reinforcement to the contention of chemical experts that disarmament of chemical warfare material is impossible because the same chemicals are effective on the battlefield and in the peacetime factory.

Despite the military effectiveness of phosgene, it is quickly dissipated once it is liberated in the open air. After ten or fifteen minutes the concentrations should be so diminished as not to be deadly, chemical warfare experts declared today. In this respect phosgene differs from blistering mustard gas, which sticks to the ground and persists for days after it is let loose. Mustard gas is considered the most effective of all war gases. Ammonia and water are effective in neutralizing phosgene.

A less serious phosgene explosion occurred some time ago at Boundbrook, N. J.

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Face to Face with a Wasp

Entomology

To most people, a wasp is a good thing to keep away from, but on our cover this week we present one—in the way that he would appear if you were as small as he, and should meet him face to face. The picture is from a photograph by one of the most enthusiastic and successful photographers of insects—Miss Cornelia Clarke, of Grinnel, Iowa.

Though it would take a person much better versed in insect physiognomy than any entomologist to distinguish one wasp from another in such a photograph, it is a fact that wasps do have personality. In his "Insect Book" (*Doubleday, Doran*), Dr. L. O. Howard, former chief of the U. S. Division of Entomology, tells of the observations of George W. and Elizabeth G. Peckham, two leading students of wasps. The personality of the wasps "was of such mental attributes as careful painstaking or carelessness, and industry or laziness. One seemed to hurry tremendously, and spent no time on non-essentials. Another was an artist, working for a long time on the closing of her burrow, arranging the surface with scrupulous care and sweeping away every particle of dust to a distance. Still another went to the extreme in carelessness, carrying the caterpillar in a very careless way and making a nest which was a very poor affair."

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In This Issue—

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All of the resources of Science Service, with its staff of scientific writers and correspondents in centers of research throughout the world, are utilized in the editing of this magazine.

Average Sleep Ration 25 Years

Psychology

By Donald A. Laird

Dr. Laird is the director of the Colgate Psychological Laboratory.

Rip Van Winkle slept for twenty years. This record is surpassed by the average man who lives out his allotted three score years and ten, for the seventy-year-old person has spent more than twenty-five years in sleep.

Sleep overtakes an individual at the close of his day's work, and after about eight hours it releases its hold. Beyond this the average person and most scientists know little. Scientific workers who have devoted their time to intensive studies of sleep number scarcely a dozen since the beginning of the scientific era; while in contrast there are at the present moment more than 100 scientists working on how to make the face more attractive by surgical procedures.

IN THE SLEEP LABORATORY: A row of the "human guinea pigs" who dedicated themselves to the cause of finding out why and how human beings sleep

DR. DONALD A. LAIRD, director of the Colgate Psychological Laboratory, who tells of his experiments on how and why we sleep

At the Psychological Laboratory of Colgate University we have been trying to find out all we can about sleep, especially what is practical and best.

Beginning three years ago at Colgate, volunteer subjects slept in quarters that the fraternity houses loaned us for temporary use. The investigation has grown and expanded from that beginning, until next year an entire ten-room house will be used for the sleep laboratory.

Since the field has been practically untouched it has been necessary to plan and construct much apparatus for studying what goes on in people while they sleep, and how sleep can be made most restful.

Some of the apparatus is constructed so that time is measured not in merely seconds or tenths of seconds, but in thousandths of seconds. In measuring muscular relaxation, which appears to be of paramount importance in restful sleep, we have had to devise other instruments which will tell us the effect a single twitch of a finger has upon the total muscular relaxation of the sleeper's body.

We have had to develop special methods to measure the exact amount of bodily energy expended when doing work after sleep of various kinds and amounts.

The greatest difficulty in the experimental work is in the loss of sleep it demands from those being experimented upon and those doing the experimenting. It is somewhat of a lark to stay up unusually late one night. But when the experimenters request that you get along with six hours of sleep every night for a month in place of the eight you have been accustomed to having, the fun disappears the second night about ten o'clock. Nevertheless we were able to get some students to make this sleep sacrifice without credit or pay three years ago.

We have also had our "human guinea pigs" sleep with a gas mask glued to their faces for a half year of nights at a time so that we could make chemical analyses of the expired air the whole night long. In this particular case the more severe hardship fell upon those making the experiments since they had to keep wide awake all night to make accurate determinations of the energy expenditure of those enjoying sleep. Two subjects sleeping peacefully with gas masks will keep ten others awake making the chemical analyses of exhaled breath collected through the masks.

Other cruel and inhuman practices are essential in order to discover the what and why of (*Turn to next page*)

Sleep—*Continued*

sleep. Imagine yourself, for instance, being awakened at four o'clock this morning and put through strenuous tests for an hour and a half on this incomplete amount of sleep; tests which range from how much electricity is needed to shock you, to lifting weights with your middle finger every second until you are exhausted and unable to lift even an ounce.

Then further imagine you are awakened for the same work at three o'clock two mornings later, then at two o'clock, and so on until all the hours of your sleeping period have been tabulated and charted. It takes considerable determination to stick through a job like that when you also have your regular work to do during the daytime when sensible people work exclusively. But you can never fully appreciate the complete pleasure of a long Sunday morning sleep until you have been through a semester or two of such work.

It comes to many people as somewhat of a surprise to find that another hardship is changing from a medium soft, comfortable bed to a hard and sagging bed. This demands more will power in some cases than to cut down on one's hours of sleep. But sleeping in uncomfortable beds is just another of the cruel and inhuman things we require of our subjects from time to time, although there are thousands of people complacently sleeping on beds far from comfortable or right and blissfully ignorant of the fact. Since our boys have slept around on different combinations of mattresses and springs in the laboratory they have found that differences in the restfulness of two beds may be as marked as changes in the weather.

The best bed combination to sleep upon to obtain most restfulness seems to be a medium soft bed with a large number of vertically placed coil springs. A bed which sags keeps muscles under tension and does not allow for a desirable amount of restfulness.

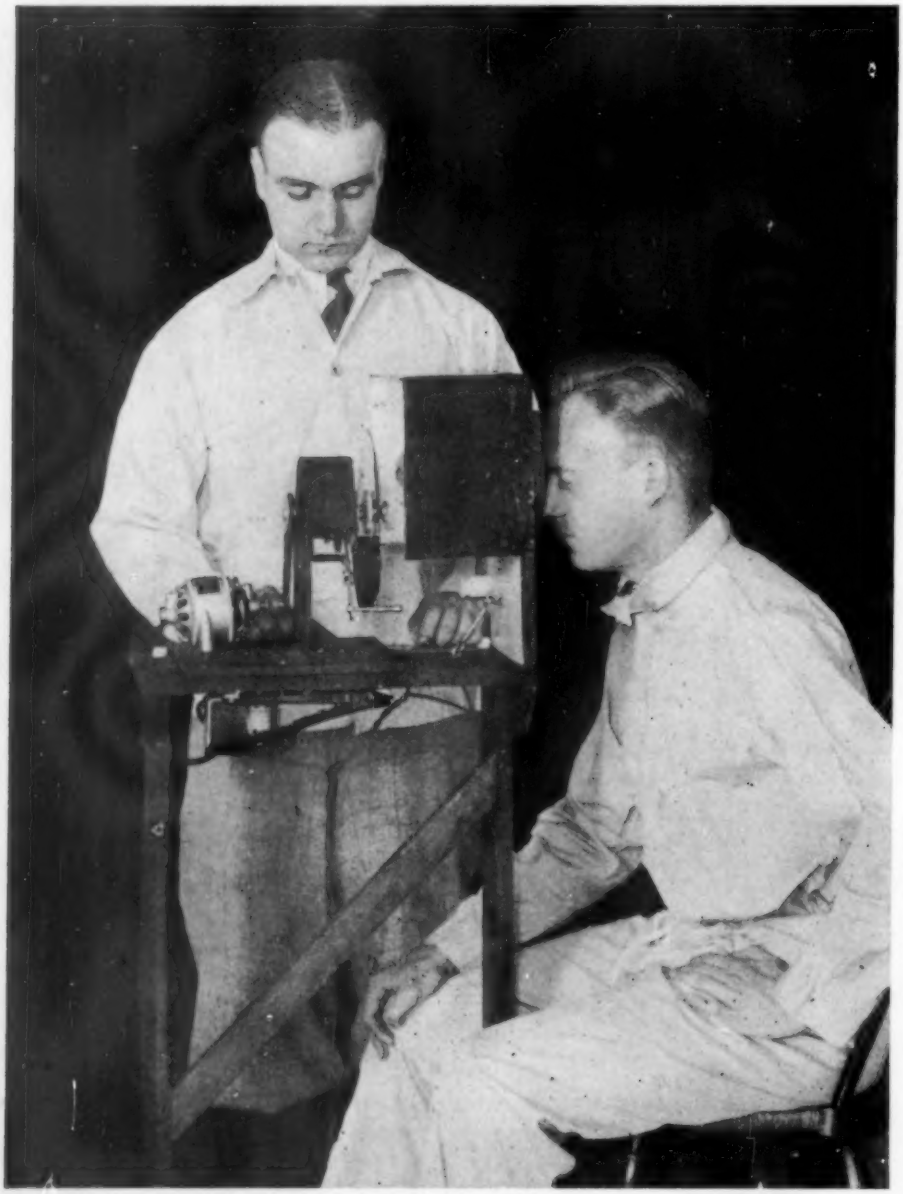
We were somewhat astonished to find that a bed can be too soft, especially for the person of above average weight. In some of the tests seven hours sleep on some beds gave a recovery equal to eight hours on other beds. The type of spring and mattress found in practically all college dormitories gives a poor sleeping combination. A praiseworthy charity to undertake on a national scale is to replace these since a poorly rested person is the weak-willed person.

We have found that the old idea that sleep is deepest the first few hours expresses the truth. It does not matter whether the first two or three hours come before midnight or after midnight. More noise is necessary to awaken a person during the first hours of his sleep. If he is awakened it is harder for him to keep awake. There is intense bodily metabolism due to the rebuilding activities taking place. And recovery of ability to do strenuous tests appears more marked after the first two or three hours' sleep than during the following six hours.

It is probably fortunate that we cannot do away with the first two hours' sleep. Otherwise some people trying to cheat nature might do as the Irishman who enlisted in the army and found that his blanket was so short that when it covered his feet it did not reach to his chin. So he cut six inches from the bottom of his blanket and sewed it to the top.

We have also found that if you cut down on sleep you will probably have to pay a price for it. After the loss of even two hours' sleep we have found that difficult mental work is adversely affected, and almost invariably more calories of bodily energy are required to do the work than were needed when the regular amount of sleep had been maintained.

Napoleon is sometimes cited as having got along on unusually small amounts of sleep. (*Turn to page* 365).



TESTING THE EFFECT of too little sleep on vision

Report Cure for Mongoloid Idiots

Psychiatry

Mongoloid idiots—those baffling cases of defective children that look like flat-faced oriental dolls—may be reclaimed from their smiling, contented state of idiocy and in some cases they may even reach practically normal intelligence. This was the encouraging report made by Dr. Walter Timme, of New York, before the American Association for the Study of the Feeble-minded.

The cause of Mongolism and how to treat it are still uncertain, though it is generally recognized as a gland disorder. Dr. Timme described his theory, which traces many of the symptoms of Mongolism to faulty development or lack of development of the fore section of the pituitary gland. This gland is located at the base of the brain and its secretions enter both the blood and the cerebrospinal fluid.

Working on this theory, Dr. Timme stated that he has been feeding Mongoloid patients pituitary substances, both of the whole gland and particularly of the fore lobe of the gland. Hypodermic injections of the gland solution have also been given and in addition the patients have been given the usual thyroid treatment.

"As a result of ten years of this work, I have brought many of my Mongoloid patients to much higher levels than we have heretofore been able to do," he said.

Some of these children, who had started in life with the prospect of remaining idiots, unable to dress themselves, talk properly, or even eat like normal children, learned to do arithmetic up to multiplication by three or more figures and long division. They also learned to write letters and do oral arithmetic, which is remarkable achievement for these cases.

One of the patients, described by Dr. Timme, has attained an Intelligence Quotient of 90, which brings this child up to average intelligence.

Not all of the children treated have attained this degree of improvement, but Dr. Timme declared that "we have with these means accomplished more than by any previously known treatment, so far as I am aware."

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Chimpanzees Serve Science

Zoology

Two of the few chimpanzees in captivity are now resident at the Johns Hopkins Medical School where they are expected to contribute to science important information on the comparative growth rates of man and his animal relatives.

Under the direction of Dr. Adolph H. Schultz, associate professor of physical anthropology at Johns Hopkins and research associate of the Carnegie Institution of Washington, measurements of the two chimps will be made regularly. Their rate of growth will be compared with that of children of comparable age.

The female chimpanzee, called Evo, short for evolution, has just arrived here but the male has been here for six months.

So far they are a very happy couple, but Dr. Schultz said today that theirs is a true chimpanionate marriage for if they quarrel too much he will send Evo back home.

The dwelling cage for the couple has all the modern improvements, including ultra-violet rays and bathtub to keep them healthy and happy.

Thanks to the ultra-violet rays, the male chimpanzee is now twelve pounds heavier than when he arrived six months ago, his hair is thicker and his body better developed. Evo's last home was a small dark box. She is small and thin and her fur coat is shabby. But a month's basking in the artificial sun rays is expected to improve her health markedly.

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Judge Should Know Prisoner

Criminology

A judge should not pass sentence upon a prisoner until he has before him the facts about the prisoner's early life, home background, and past conduct, and also a psychiatrist's report as to the prisoner's intelligence, mental stability and sense of responsibility. This was the opinion expressed by Dr. Sanger Brown, 2d, deputy commissioner of mental hygiene of New York State, in an address before the American Association for the Study of the Feeble-minded.

When the judge has this information before him, he should then pronounce sentence, not specifically for the offense which brought the case into court, but in consideration of the past history and past conduct of the prisoner, Dr. Brown declared.

Not all criminals are insane or feebleminded, but every criminal should be studied by a psychiatrist, the speaker said. Certain chronic offenders of psychopathic type should be detained, perhaps for life, in order to protect society against them, he said; and prisoners should be released on probation or parole only after mental examination and under a psychiatrist's direction.

The emotional attitude of the public and of officials adds to the complexity of the crime problem, Dr. Brown said, but in time the facts will be understood sufficiently so that reasonable methods of dealing with lawbreakers can be adopted.

"It will then be possible to do justice to society and to the criminal also," he stated.

Science News-Letter, June 9, 1928

Oils for Insulation

Physics

Scientific research on oil is concerned not merely with its uses as lubricant and fuel but with its less known but almost equally important utilization in the insulation of electric wires. Oil is one of the best insulators known, but not all oils are equally good in this respect, according to T. N. Riley and T. R. Scott of the Institution of Electrical Engineers in London.

High-voltage cable insulation usually consists in part of layers of oiled paper. In handling, the layers of paper must slide freely over each other, and to this end the insulating oil must also be a good lubricant. The oil must also be a good conductor of heat, so that the cable may remain cool even when it is carrying a heavy load of current. Finally, the formation of "gas" pockets between the layers must be avoided, for these spaces would permit brush discharges to take place and set the cable afire.

Science News-Letter, June 9, 1928

Physical Science in the XVIIth Century

Physics

MARTHA ORNSTEIN in *The Rôle of Scientific Societies in the Seventeenth Century* (Univ. of Chicago Pr.):

As regards instruments [the seventeenth century] produced the microscope, telescope, and machinery for grinding their lenses. It originated an exact time-measuring instrument in the pendulum; it brought into existence the thermometer and barometer, and the air pump. It created therefore the most fundamentally important apparatus of the modern physical laboratory.

The seventeenth century first produced the places where, and conditions under which experimentation could be carried out. There is one exception to this statement. Chemistry, i. e., alchemy, had had its laboratories, i furnaces, cooling and drying apparatus, mortars, countless glass vessels, distilling contrivances, for many preceding centuries. The apothecary had had his distilling apparatus, his furnace for chemical and pharmaceutical operations. But the conception of a physical laboratory and a non-alchemistic and non-pharmacological laboratory was the creation of the seventeenth century. To be sure the earliest laboratories were not very well equipped. The bedroom or kitchen of the scientist was often used as a place for experimentation. Newton's optical researches were made in his lodgings. Robert Boyle tested his laws of elasticity of gases in tubes along the stairs. But before the end of the century such informal workshops of scientists were in some rare instances supplanted by laboratories in the modern sense of the word, supplied with instruments of measurement and with facilities for research work. By 1700 both the chemical and physical laboratory existed in embryonic form.

The astronomical laboratory, the observatory, on account of its affiliation with astrology, existed much earlier. But the seventeenth century created the modern observatory, equipped with telescopes and fine instruments for exact research, prepared for the task of making systematic maps of the celestial regions. The seventeenth century multiplied the establishment of botanical gardens. . . . .

The subjective side of Rosenberger's statement, "that the seventeenth century introduced experiment into science," signifies, as has been said, that it produced scientists and scientific skill. The truth of this statement can best be shown perhaps, by comparing, in the various scientific fields in broad outlines, the information of a man familiar with the whole range of science in 1600—whom we shall for convenience call A—with that of a man B, in 1700, similarly instructed in the entire scientific knowledge of his time. The difference between the scientific truths in the possession of A and B will then represent, to borrow a phrase from mathematics, the "integration" of the "differential" work and skill of the many individual scientists of the century. Besides, we shall in this way gain a clearer perception of how much the seventeenth century added to the fund of scientific knowledge.

Commencing with physics, and taking up first the fundamental chapter of dynamics, A was permeated with Aristotelian ideas; B, through Galileo, Kepler, and Newton, was in many respects at the level of present-day information. The vast difference this represents may be indicated as follows:

A believed that:

1. Bodies have either a natural motion downward or upward. The former are called "heavy," the latter "positively light."

2. There are two types of motion: that of heavenly bodies is perfect, circular, unchanging; that of earthly bodies is rectilinear and requires for its maintenance a force acting continually. If the force stops, it stops.

3. Bodies fall in accelerated motion because as the body falls the air gives it speed; hence in a vacuum (if conceivable) bodies would fall with uniform velocity.

4. Heavier bodies fall more quickly than light bodies.

B knew that:

1. All bodies are subject to the force of gravitation and are "heavy."

2. Every body, celestial or terrestrial, continues in its state of rest or of uniform motion in a straight line, unless it be compelled by a force to change its state. Uniform rectilinear motion would thus continue forever unless it met resistance. "Force" is that, by means of which rest or motion of a body is changed.

3. Bodies fall in accelerated motion because of the force of gravitation; air does not accelerate but impedes motion.

4. All bodies fall with uniform acceleration.

Turning from the chapter on dynamics to pneumatics, A could not conceive of the weight of air, or of the creation of a vacuum. "Nature abhors a vacuum" would to him be an axiomatic truth. B would understand the nature of atmospheric presence (Torricelli); its variation in different weather, at varying altitudes: He would have an air pump and know most of the properties of a vacuum (Guericke and Boyle). . . .

In optics, A would know considerably more than in other fields; for ever since Roger Bacon, the focal properties of spherical mirrors had been understood. Maurylocus (1494-1575) had studied lenses. Then Della Porta's book, *Magiae naturalis*, contained a description of the *camera obscura*, even of a combination of lenses which has been claimed to be the first telescope. B, on the other hand, would be acquainted with the most minute details about the focal properties of lenses (Kepler and Descartes); he would comprehend the laws of refraction of rays passing from thinner into thicker medium (Snellius); he would even be initiated into the phenomenon of diffraction (Grimaldi). He would be aware of the nature of white light and its decomposition into the spectral colors (Newton). He would have learned of the two theories of explaining light: the corpuscular theory of Newton (then accepted), and Huygens' and Hooke's theory of undulation (now accepted).

In magnetism and electricity, A would be acquainted only with the magnet and compass and the electric properties of amber. B, although his knowledge would be much less in this than in the other branches of physics, would nevertheless comprehend the phenomena of terrestrial magnetism, magnetic declination and inclination; he also would be aware of other substances besides amber which exhibit electric properties (Gilbert and Guericke).

In no other science did the seventeenth century, starting from so little, reach so far as in physics; no other science records during the century so many pioneer experimenters.

CLASSICS OF SCIENCE:

The Daguerreotype

Physics

The SCIENCE NEWS-LETTER would be greatly interested to learn of any successful modern daguerreotypes made by the following original directions. Address "Classics Editor, Science Service, 21st and B Streets, N. W., Washington, D. C."

PRACTICAL DESCRIPTION OF THE PROCESS CALLED THE DAGUERREOTYPE, which consists in the spontaneous reproduction of the images of natural objects, in the Camera Obscura; not with their colours, but with great delicacy in the gradation of the tints. By Daguerre. Translated for the Journal of the Franklin Institute, by J. F. Frazer (November, 1839).

Description of the Process

The drawings are made upon thin sheets of silver, plated upon copper. Although the copper serves principally to support the plate of silver, the union of these two metals promotes the perfection of the result. The silver should be as pure as possible. . . . The thickness of the two metals should not exceed that of a stout card.

The process is divided into five operations.

The first consists in polishing and cleaning the plate, so as to render it fit for receiving the sensitive coating.

The second, in applying this coating.

The third, in submitting the plate thus prepared, to the action of the light in a camera obscura, in order to receive upon it the picture from nature.

The fourth, in causing this picture to appear; it not being visible when first taken from the camera obscura.

Finally, the fifth has for its object the removal of the sensitive coating which would continue to be modified by the light, and would tend necessarily to destroy the impression altogether.

First Operation

This requires a small flask of olive oil; very fine carded cotton; pumice ground exceedingly fine, tied up in a piece of muslin sufficiently thin to suffer the pumice to pass through it easily, when shaken; a bottle of Nitric Acid diluted with water in the proportion of one part (by measure) of acid, to sixteen parts (by measure) of distilled water; a frame of iron wire upon which the plates are put in order to heat them by means of a small spirit-lamp; and finally a small spirit-lamp.

As was before mentioned, the drawings are made upon silver-plate. The size of the plate is limited by the

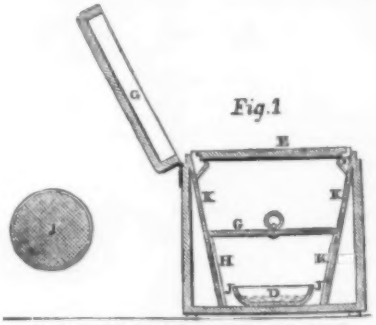
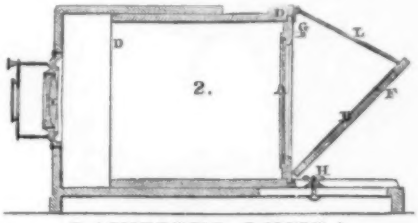


Fig.1

SENSITIZING THE PLATE



DAGUERRE'S CAMERA

size of the apparatus. It must in the first place be well polished. For this purpose, it is sprinkled with pumice (shaking it without touching the plate) and is rubbed gently, in a circular direction, with cotton soaked in a little olive oil. In this operation the plates are laid upon a sheet of paper which must be renewed from time to time.

The pumice is re-sprinkled and the cotton renewed several times. . . .

When the plate is well polished it must be freed from the oil, which is done by sprinkling it with pumice and rubbing it dry with cotton, rubbing always in curves; a good result cannot be obtained by rubbing otherwise. A small plug of cotton is then made, which must be wet with a little acid diluted with water as above mentioned. . . . The plate is then rubbed with the plug, taking care to spread the acid perfectly over the whole surface of the plate. . . .

The plate is then sprinkled with pumice and rubbed very lightly with fresh cotton.

The plate must then be submitted to a high heat. For this purpose it is placed upon a frame of iron wire, raised to a proper height by legs, the silver above, and the spirit-lamp is passed backwards and forwards along the under surface of the plate, so close that the flame may be broken upon it. After having passed the lamp for at least five minutes under every portion of the plate, a light, whitish coating forms upon the surface of the silver.—The action of the heat is then withdrawn. . . .

The plate is then quickly chilled by placing it upon a cold surface, such as a marble table. When it is cold it must be again polished, which is quickly done, since it is only necessary to remove the whitish coat which has formed upon the silver. . . . When the plate is well burnished, it is rubbed, as above mentioned, with the acid diluted with water, sprinkled with a little pumice, and rubbed very lightly with a plug of cotton. The acid must be renewed three times. . . .

Second Operation

For this operation we must have: The box figured in Figure 1; a rectangular frame of wood; four small metallic strips of the same nature as the plate; a small hammer and a box of small nails; a little iodine.

After the plate has been fixed upon the frame by means of the metallic strips and small nails which are driven with the hammer designed for that purpose, the iodine must be placed in the capsule which is at the bottom of the box. The iodine must be divided in the capsule in order that the focus of emanation may be larger, otherwise, an iris would form at the centre of the plate which would prevent the obtaining an uniform coating. The wooden frame is then placed, the metal downwards, upon the small brackets fixed at the four angles of the box, and the cover is shut. In this position it must be left until the surface of the silver is covered with a perfect coating of a golden yellow colour. . . . The time necessary for this operation cannot be determined, for it depends upon several circumstances. . . .

When the plate has attained the proper colour it must be placed in a frame which fits into the camera obscura. The light of day must be prevented from striking upon the plate; for this purpose, therefore, we use a candle, the light of which has much less action; this light must not, however, be suffered to strike too long upon the plate, upon which it will leave marks. . . .

Third Operation

No apparatus is necessary for this operation except the camera obscura, Figure 2. The third operation is that in which the picture is obtained by means of the camera. Objects illuminated by the (*Turn to next page*)

The Daguerreotype—*Continued*

sun must be selected as far as possible, because the operation is under these circumstances much more prompt It may easily be conceived that as the result is caused by the light alone, the action will be quicker, in proportion as the objects are more strongly illuminated, and are naturally whiter.

After placing the camera obscura opposite to the landscape, or whatever other object we may desire to copy, the important point is to arrange the focus so that the objects may be defined with great clearness, which is easily done by drawing out, or pushing in, the frame of the ground glass which receives the image. When great precision has been attained . . . the frame of the glass is then withdrawn (taking care not to derange the camera) and replaced by the apparatus which contains the plate and which fits exactly into the place of the glass. When this apparatus is properly adjusted, by means of the small copper buttons, the opening of the camera is closed, and the interior doors of the apparatus opened by means of the two semi-circles. The plate is then ready to receive the impression of the view, or object, which has been chosen. Nothing remains but to open the diaphragm of the camera, and count the minutes by the watch.

This operation is one of great delicacy, because nothing is visible, and it is utterly impossible to determine the time necessary to produce the effect, since this depends entirely upon the intensity of the light from the objects which we wish to copy; this time may vary, at Paris, from three to thirty minutes. . .

Fourth Operation

For this we must have a bottle of mercury containing at least 2 pounds; a spirit lamp; a glass funnel with a long neck; the apparatus, figured in Figures 3, 4.

Enough mercury is poured, by means of the funnel, into the capsule placed at the bottom of the apparatus, to cover the bulb of the thermometer. This requires very nearly two pounds. From this time we can use no light except that of a candle. The board upon which the plate is fixed is withdrawn from the frame (the cover of which preserves it from the contact of the light) and slid into the grooves of the black plate (Figure 3). This black plate is then replaced in the apparatus upon the brackets, which retain it at an angle of 45°, the metal below, so that it can be seen through the glass; the cover of the apparatus is then gently closed, so as to prevent the concussion of the air from causing the particles of mercury to fly about. When everything is thus arranged, the spirit lamp is lit and placed under the capsule containing the mercury, and there left until the thermometer (the bulb of which is plunged into the mercury—and the tube passes outside of the box) indicates a heat of 140° Fahr. (60° Cent.); the lamp is then quickly withdrawn; if the thermometer has risen rapidly, it will continue to rise without the assistance of the lamp; but we must be careful not to let it rise above 167° Fahr. (75° Cent.)

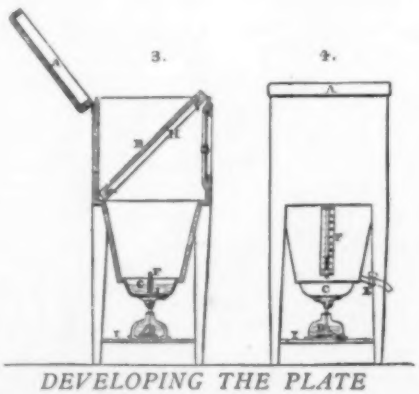
The impression of the image exists upon the plate but is not visible; it is not for some minutes that it begins to appear. . . . The plate must be left until the thermometer has again descended to 113° Fahr. (45° Cent.); it is then withdrawn and this operation is terminated. . . .

Fifth Operation

The object of this operation is to remove the coating of iodide, which would otherwise, when the impression had been too long exposed to the light, continue to decompose and destroy the picture.

For this operation we must have a saturated solution of common salt, or a weak solution of pure hyposulphite of soda; an inclined plane or frame; two tinned copper pans; a kettle of distilled water.

The salt water is poured into one of the basins to within about one inch of its edge; the other is filled with ordinary pure water. These two liquids must be heated, but not to boiling. The solution of common salt may be replaced by a solution of pure hyposulphite of soda, this is even preferable, because it removes the iodide entirely, which the solution of salt will not always do, especially when the impressions have been made for some time.



DEVELOPING THE PLATE

The plate is first dipped into the pan containing pure water . . . then, without suffering it to dry, it is plunged into the salt-water. If the plate is not dipped in the pure water before plunging it into the solution of salt or hyposulphite, these will make ineffaceable stains. . . .

We then take the inclined frame, and the kettle, which must be very clean, and in which distilled water has been boiled. The plate is taken from the pan of water, and placed at once upon the inclined plane; then, without giving it time to dry, distilled water, very hot, but not boiling, is poured upon the surface of, and from above, the plate, so that, in descending, the water may form a sheet over its whole surface, and carry with it the whole of the solution of salt or hyposulphite, already much weakened by the immersion of the plate in the first pan.*

After the washing, the picture is finished, nothing remains but to preserve it from dust and from vapours which might tarnish the silver. The mercury which causes the image to be visible, is partly decomposed, it adheres to the silver, resists the water poured upon it, but cannot sustain any rubbing.

To preserve the impressions, they must be put under glass and cemented in; they are then unalterable, even in the sun.

Louis Jacques Mande Daguerre was born at Cormeilles, France, in 1789, and died at Petit-Brie-sur-Marne, July 12, 1851. He was first an inland revenue officer, then became a scene painter for the opera in Paris. At the age of 33 he and Bouton opened the Diorama in Paris, a place of amusement, where he arranged unusual scenic and lighting effects. Later he opened a similar place in London. Daguerre then became interested in the possibility of fixing the camera image. In 1839 he received word from J. Nicéphore Niepce that he was working along the same lines, using asphalt and oil of lavender. The two worked together until Niepce's death, four years later. Daguerre finally succeeded in the project. In 1839 his Diorama was destroyed by fire. The same year, for the perfection of his daguerreotype, the inventor was made an officer of the Legion of Honor. He and Niepce's heir were granted annuities on condition that the process be printed. It was accordingly published by the government August 2, 1839.

*If the hyposulphite solution be used, the water should be less warm than with the common salt.

Comets and Meteors May Surround Stars

Astronomy

Evidence that many, if not all, stars are surrounded by meteors and comets like those we see in the solar system, and that they may serve as fuel to keep the stars going, is the announcement just made by Dr. Harlow Shapley, director of the Harvard College Observatory. If this is correct, it would explain how the stars may survive for a far longer time than the 100 trillion years that astronomers have recently supposed to be their maximum life.

By means of the spectroscope, which breaks their light up into a rainbow-like spectrum, crossed by numerous dark lines and bands that indicate the constituent elements, Dr. Shapley has studied a large number of stars. Though they are of varying temperatures, and supposed to be of different ages, they all show a band which indicates the presence of cyanogen. This is a gas composed of carbon and nitrogen, and which is used terrestrially for killing insects.

Probably, he believes, this cyanogen is not actually in the stars themselves, but rather it is provided by meteors and comets that surround them. Comets and meteors that have come within range of observation have been found to contain carbon and nitrogen as separate elements. When these fall into a star, the high temperature would cause the elements to combine to form cyanogen.

One important aspect of this hypothesis concerns the life of the stars. The generally accepted theory now among astronomers is that the energy of the stars comes from the actual disintegration of their matter into energy. Matter and energy, according to the ideas of modern physics, are both the same, and so one can be changed to the other. In this way the matter in the average star will keep it running for about 100,000,000,000,000 years.

However, if more and more fuel is constantly being shoveled on the stars, in the form of meteoric material, the star might survive almost indefinitely.

Science News Letter, June 9, 1928

Mental Defects in Infants

Psychology

"Jimmie hasn't begun to say 'da-da' the way that lively Smith baby does," say's Jimmie's mother confidentially to Jimmie's father, "and he still doesn't get the idea of playing peek-a-boo at all."

"But," they both reassure themselves, "Jimmie will catch up, of course. Babies develop so differently."

A warning against this sort of careless faith that baby will outgrow mental handicaps and shoot ahead at some later age was voiced by Dr. Arnold Gesell, psychologist of Yale University, before the American Association for the Study of the Feeble-minded.

The Yale Psycho-Clinic has carefully studied the behavior of several hundred normal babies and a large number of retarded and defective infants. As a result, a schedule has been worked out of 135 items which are characteristic of normal stages of development in the first year of life, Dr. Gesell said. When and how an infant fixes his eyes upon an object, what he does when a toy is removed from his sight, how he uses his hands—these reactions change with age, he pointed out.

"The growth of the human mind is already under way at birth," the psychologist stated. "Each month witnesses some change in the baby's muscular control, his posture, his language, memory, insight, responsiveness, and adjustments to other persons. These changes tend to proceed in an orderly manner with due reference to his age."

Growth is so swift in infancy that even one or two months of retardation at that time may prove important later. This has been shown, Dr. Gesell said, by clinical case reports in which mental growth charts of babies were kept. These cases demonstrate that a child's mental status can be predicted to some extent in infancy.

The earlier mental defects are recognized, the more opportunity there is for prevention and control, just as in physical handicaps, the psychologist pointed out.

Dr. Gesell stressed the fact that methods of diagnosing mentality in babies are still being worked out, and should be used only by professional trained persons with clinical experience.

Science News-Letter, June 9, 1928

Walrus Near Boston

Zoology

While today walruses are practically confined to the little visited arctic seas, within historic times they have been common as far south as the Gulf of St. Lawrence, and the recent finding of a skull on Georges Bank, off the coast of Massachusetts, seems to indicate that these mammals did come down as far south as Northern United States waters perhaps no longer than two or three hundred years ago.

This interesting specimen, consisting of the fore part of a walrus skull with the tusks still in place, was recently dredged up by the steam trawler *Mariner* at a depth of 80 fathoms. Col. J. M. Andrews has turned the skull over to the Boston Society of Natural History.

Science News-Letter, June 9, 1928

A House of Elk Horns

Zoology

Yellowstone Park headquarters at Mammoth Hot Springs will have a house built of elk antlers to display to visitors during the coming season as part of the exhibits of the park museum. It will be only a little house, containing a single room six by eight feet and seven feet high, but even so its construction will require some thousands of pairs of antlers.

Each year every adult male in the 20,000 elk in the park herds sheds a pair of antlers, so that large quantities of these have been easy to obtain. Enough have been brought to Mammoth Hot Springs to provide walls and roof for the "house of horn," which Chief Ranger Sam Woodring has undertaken to construct.

Science News-Letter, June 9, 1928

Locusts Fight Kindred

Zoology

Big predatory locusts, that prey on their own fellow-insects instead of on growing grain crops, are being tried out in Greece as one means of combating the pest of ordinary locusts now threatening the fields, according to word received here from Athens. These modern descendants of one of the plagues of Egypt have been causing serious losses to Greek agriculture during the past few years, and the Ministry of Agriculture is preparing to spend 16,000,000 drachmas (approximately $3,200,000) in a campaign against them.

Science News-Letter, June 9, 1928

The Penalty of Neglect of Science

General Science

Extract from the report of the American Association for the Advancement of Science's special committee on *The Place of Science in Education*:

When harassed by those who *argued* against vaccination Dr. William Osler, famous scientific physician then engaged in England, issued the following challenge, "I will go into the next severe epidemic with ten selected vaccinated persons and ten unvaccinated persons. I should prefer to choose the latter—three members of Parliament, three anti-vaccination doctors, if they could be found, and four anti-vaccination propagandists. And I will make the promise neither to jeer nor gibe when they catch the disease, but to look after them as brothers, and for the four or five who are certain to die I will try to arrange the funerals with all the pomp and ceremony of an anti-vaccination demonstration." It is not recorded that anyone offered to accept Dr. Osler's challenge.

It seems impossible to have such science knowledge as that pertaining to health become most useful until it is built into one's emotions and his social relations, as well as into his thinking, consciousness, and appreciation. In an earlier day children in schools and homes frequently were affected with a form of "itch" caused by a very small epidermal insect. In closed, unventilated and unclean school rooms and homes this insect could thrive and extend its disturbances to all with whom it came in contact. During the childhood of many persons living now, to have the "itch" was an annoying misfortune but not a social disgrace. When the facts about the parasite became known, its relation to uncleanness and carelessness was demonstrated, and the "best families" didn't have it. Soon it became a social disgrace not only to have the disease, but even to perform those active superficial manifestations which indicate an itching epidermis. Today "itch" is almost unknown and so objectionable as to make even this use as illustration seem disturbingly bold. Likewise, much other science knowledge must be carried beyond mere knowing into the field of social use, into codes of human relationships, before it is most readily effective.

It must be recalled that in the very nature of things, newly discovered truth is at first in the possession of one or a few persons. No matter how helpful the new truth might be, the majority, indeed almost all persons, will be uninformed about it, hence may be unsympathetic with its use, until they become informed in some convincing way. A voting majority in a democracy is a serious menace unless it is an educated citizenry. Probably each great scientific discovery would have been voted down if its case had been left to popular vote. We need but turn the pages of history to read of the hundreds of Gallileos, Harveys, Newtons, Huxleys and Darwins whose discoveries were voted down by the large majority. Fortunately gravitation, heart-beats, attraction of planets, and forces that control the development of living things, have not yet heard the voice of the majority.

Persons who have traveled much about the earth, report that probably the majority of the human race would still vote that the earth is not round; that some form of incantation gives at least temporary protection from disease; that supplication for rain is effective; and that taboos and mystic signs are potent in curing human ills and in contributing to the welfare of the believer and his friends. Majorities are very dangerous, if uninformed. The process of informing is slow. It is opposed by belief in what has been known, by lack of intellectual desire and vigor on the part of many, and by intellectual and social "vested interests." Slosson has said: "In actual life ignorance is allied to conservatism, and the combination is a strong one. In order to introduce a new idea into the mind of man it is generally necessary to eject an old idea. To move in new furniture one has first to move out the old."

It must be recalled, also, that only a few discover new truths and that these few must inform the many. The many must be informed in terms and by examples within their own range of experience. It is useless to hang up a light whose rays are outside the range of vision of him for whom it is put up. He may be outside the range in mere distance, or his sensitiveness to light may not fall within the scope of the light waves in use.

Then it must be further recalled that rapidly growing knowledge, increasing intellectual effort, and accumulating regulations of human conduct cause added tensions upon minds. Often these minds are unused or ill-adapted to added intellectual and social loads, and prefer to evade the somewhat unnatural strain. It is easier to vegetate than to work, and growing knowledge illy suits an increasingly quiet life. It is only when the rewards of scientific knowledge are greater than the comforts of a quiet life that dissatisfaction arouses to the necessary effort for gaining new ideals.

Science instruction both in school and out needs better organization, more effective cooperation to make even the health knowledge now available function more completely in the lives of people generally.

Sex and Digestive Organs Prey of Cancer

Medicine

"If, in some manner or other, malignant tumors of the alimentary tract and of the reproductive organs could be prevented, cancer would retire at once to a relatively unimportant place among the causes of death."

This statement was made by Dr. Raymond Pearl, director of the Institute for Biological Research of the Johns Hopkins University after the completion of a statistical survey, made by himself and Miss Agnes Latimer Bacon, on necropsies performed on fatal cancer cases in the Johns Hopkins Hospital.

In summarizing the results of the survey in the *Archives of Pathology*, he stated that in men, malignant tumors occurred more frequently than anywhere else in the organs of digestion, such as the stomach, intestines, gall bladder and liver. In the women the cancers were found in the reproductive organs. These conditions are in general agreement with the cancer figures of the U. S. Census Bureau, he pointed out.

"The greatest discrepancy between the general population and the necropsy statistics is in respect of cancer of the skin," added Dr. Pearl. "Patients with cancer of the skin die at home rather than in a hospital relatively more frequently than do patients with cancer of any other organ system. This fact means that such cases tend to be under-represented in necropsy statistics. The patient who enters a hospital with cancer of the skin in an early stage is discharged cured. But for the patient who lets his cancer of the skin go without treatment, or with the supposedly palliative treatment of quackery until it is destined shortly to be fatal, a hospital has little to offer."

From these studies it appears that more of the different organ systems of the body are susceptible to cancer in white people than in colored. On the other hand, a relatively larger proportion of the cancers of colored people occur in the digestive system and in the reproductive system than is the case in whites. The average age at death of people with tumors that had produced secondary growths or metastases, as they are known to medicine, was found to be from one to three years earlier than in cancer without such secondary growths.

Science News-Letter, June 9, 1928

Slaves Blamed For Disease

Medicine

Hookworm, malignant tertian malaria, bacillary dysentery, and blackwater fever are some of the penalties the South is still paying for the importation of African slave labor, Rear Admiral Edward R. Stitt, Surgeon General of the U. S. Navy, told the Society of Tropical Medicine in Washington.

Of the many parasitic diseases with which Africa is afflicted, hookworm is the most serious in its transplanted home in the Southern States. A restricted area around Charleston, S. C., is infested with the parasitic worm that is responsible for elephantiasis, a disease widely prevalent in Africa. Sleeping sickness, however, though undoubtedly imported with many slaves, has never taken hold in this country on account of the absence of the tse-tse fly, its intermediate host.

"If, as I am convinced," added Admiral Stitt, "yellow fever was introduced through slave ships into the United States by infected mosquitoes, which Stokes has recently shown can transmit the disease after three months, we have here a curse greater than any of the curses which the Egyptians suffered through their enslavement of the Jews."

Science News-Letter, June 9, 1928

Wanderers Gather Pay

Economics

Young men who abandon one job for another inspire the hoary disapproving criticism, "Well, a rolling stone gathers no moss." But a survey of the histories of 170 high grade male clerks 20 to 31 years of age indicates that rolling stones often roll themselves into better positions than those that stay in one place, if they do not move about restlessly and aimlessly.

The investigation was made by Prof. Harry D. Kitson and Noel Keys, of Teachers College.

"The popular idea that the young man who remains longer with a given firm will outdistance the one who changes more frequently finds no support from the salary figures of this group," they will declare in reporting the survey in an early issue of the *Journal of Personnel Research*.

"As between working up in one concern and shifting from time to time, there is no indication that either method possesses any significant superiority."

Science News-Letter, June 9, 1928

U. S. Has Borax Monopoly

Chemistry

Exploitation of the kernite (also called rasorite) deposits in the Mohave Desert, Kern County, California, probably will result in killing off the mining of other borate minerals elsewhere in this country and in other countries, so that the United States will have a complete monopoly, according to Dr. Waldemar T. Schaller of the Geological Survey.

As far as is known, kernite, an entirely new mineral, exists nowhere else in the world. The deposit lies but three to four hundred feet beneath the surface, is more than 100 feet thick and extends at least 500 feet in every direction. It was discovered in 1926, and mining operations were begun approximately a year ago.

Kernite is virtually pure sodium borate. The material mined is over 75 per cent. pure mineral, the remainder being clay. To prepare it for the market it is only necessary to dissolve it in water, filter off the clay and permit recrystallization to take place. Marketable borax is sodium borate, plus ten molecules of water. Kernite is the same sodium borate plus four molecules of water. During the refining process six molecules of water are added, so that one ton of kernite makes 1.4 ton, or nearly a ton and a half of borax. There is probably no other commercial mineral that increases its marketable bulk in such a fashion through the process of refining.

Previous to the discovery of kernite the world's borax supply was derived principally from the minerals borax, colemanite and ulexite. Italy procured it from volcanic steam containing boric acid. In each case the process involved was complex and expensive. In this country borax was formerly secured from mineral deposits in and near Death Valley, under dangerous circumstances, and had to be hauled from the mines by the familiar "twenty-mule team" to a distant railroad.

Science News-Letter, June 9, 1928

Einstein's Real Universe

Mathematics

BEVERLY L. CLARKE, in *The Romance of Reality* (Macmillan):

What was Einstein after, anyway? What did he mean when he said that Relativity describes the "real" world, and that our previously held ideas had to do with things which were "unreal"? What does he mean by the term "real"?

Consider, with Einstein, a straight line drawn on a sheet of paper. Is it "real"? Einstein says no, because it is possible to crumple up the sheet of paper so that the line now exhibits many curves and bends and kinks; it is no longer a straight line. The same thing will clearly be true if we start with a curved line, or with any sort of line whatever. If the space through which the line is drawn happens to be "crumpled up" for some observer, this observer will see the line altogether differently from the one who drew it in his uncrumpled space.

This is a rather disturbing thing to learn. For all the material objects in the universe—as we see them—are bounded by curved or straight lines. But, according to Einstein, such objects have no reality! Are we living in a dream-world after all?

It will be easy to show, however, to our own satisfaction that Einstein's reasoning has sense to it. There is before me as I write a long table. If one should ask me the shape of this table, I should ordinarily reply without hesitation that its top is rectangular. But have I any right to say this? From where I am sitting I see the top of the table from a slanting position; an angle at one of the corners is nearest my eye and I am compelled to admit that, from where I am sitting, that corner is much the largest portion of the table, and the top looks far more like a figure with different angles at every corner than a rectangle with four right angles. If my eye were immediately over the center of the table it would indeed appear rectangular. But what right have I to consider that this observation post is any more justified by "reality" than the one in which I am now sitting?

The Theory of Relativity says I have no justification at all. It says that one observation post is no more correct than another. From this we are bound to conclude that the shape of the table top is no more rectangular than it is trapezoidal. In fact we are compelled to admit that, from Einstein's point of view, the table top has no "reality"; that is, no shape.

What then *is* "real"? According to Einstein nothing is real except what appears the same to every possible observer, wherever and however situated in space and in time. Plainly our table top looks different from every place we view it; it is therefore unreal, as far as shape goes.

Coming back to our illustration of the line on the sheet of paper, which we said was not "real", let us draw several other lines on the same sheet, in such directions that the lines cross each other. Now if we try crumpling up the paper we find that while we can alter the distances between the points where the lines cross, no amount of crumpling can change the *order* in which the intersections occur. If when the sheet was flat we numbered the crossing points 1, 2, 3, etc., we find that the order is never changed by crumpling the paper. The order never becomes 2-1-3-4, or anything other than 1-2-3-4 as it was in the beginning.

This is equivalent to saying that no matter from what point we view the intersecting lines, although the shapes of the lines and the distances between the intersections may change, the *ordering* of the intersections is always the same.

Here at last we have something that even Einstein will admit to be "real"—not the lines nor even the places where they cross—but the *ordering* of the crossings.

Now in four-dimensional space-time, crossings of lines represent events or happenings. So, carrying this illustration from the two-dimensional sheet of paper over to the space-time continuum, we reach the conclusion that the *order in which things occur* in space-time is real, and that nothing else is.

Science News-Letter, June 9, 1928

FRANCIS BACON, in *Wisdom of the Ancients* (1619):

The Life of Man is much beholding to the use of the Mechanical Arts, seeing many things (conducing to the Ornament of Religion, to the Grace of Civil Discipline, and to the beautifying of all Human Kind) are extracted out of their Treasuries.

ARTHUR H. COMPTON says:

And so we now have proton, electron and photon—these three units—out of which are made all things.

Honest Anti-Vivisectionists

Abnormal Psychology

J. B. S. HALDANE in *Possible Worlds* (Harpers):

There are a few honest anti-vivisectionists. They are, of course, vegetarians; for the painless killing of animals for physiology is no more reprehensible than their killing for meat. They wear canvas shoes, cotton or woolen gloves, and artificial pearls, if any. They refuse to sit on leather-covered chairs, or to wear horn-rimmed spectacles. They do not spray their roses, nor employ Keating's (insect) powder even under the gravest provocation. I have not met any of them, but I am quite prepared to believe that they exist. No one who does not come up to this rather exacting standard can logically demand the total abolition of vivisection. But logic is not the strongest point of the enemies of science.

Science News-Letter, June 9, 1928

Ideas Have Pedigrees

General Science

T. L. W. BISCHOFF in *Beweis der von der Begattung unabhängigen periodischen Reifung und Loslösung der Eier* (Translated by Carl Hartman):

It is well-known that in the field of reproduction one can think of scarcely a line of investigation which is not already represented in the form of speculation and theory. Indeed, every conceivable method must be tried in a matter of such importance. Hence, it is but natural that here and there are found suggestions which point more or less directly to natural laws, later established by observation and experiment. It has thus often happened that thinking minds, led by ideas and analysis, have given expression to truths which received the final proof and gained final recognition only after a great lapse of time. An important and comprehensive discovery has almost never seen the light of day suddenly; generally the elements of the discovery are contributed from various directions, making the unfolding of the truth possible. It is, therefore, clear that all of the numberless investigations and experiences which have been made and gathered in the field of reproduction must be regarded as precursors to discoveries which have furnished the final insight into the matter.

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An attempt to plant scallops on a commercial scale, as oysters are planted, is to be made in North Carolina.

Sleep—*Continued*

But we must remember he was a broken man at the age most men are in their prime. Regarding the small amount of sleep Thomas A. Edison is said to take, Harvey Firestone says he has a good laugh every time he hears the story. Edison has always taken innumerable cat-naps during the day and although his night sleep may have been short, his total daily amount was that of the average man.

There are indications that the average person is not getting enough sleep to fill nature's requirements. This is evidenced by the need of alarm clocks to get many people started on the day's work, and by the widespread popularity of getting caught up on sleep on Sunday mornings.

Many changes unknown to the individual take place during sleep. When a noisy taxicab passes a sleeper's window, for instance, there is a change in his blood pressure caused by the noise, although the sleeper is not awakened at the time. Between four and six o'clock in the morning, when sleep is light, these disturbances which we do not consciously sense are responsible for the predicament of many persons who wake and toss about restlessly. The crash of a garbage can onto a paved alley or the passing of the milkman have caused many worries about "what's the matter with me that I always wake up at five o'clock lately?"

With each question about sleep we have answered, the answer has raised a dozen new questions which are important and which can be answered in turn only by experiments. We have discovered, for instance, that during the first two hours of sleep there are some rather intense body rebuilding activities taking place. What these are we do not know, and moreover this is a question to be answered by the chemist. Chemists working in the United States Public Health Service and at the University of Chicago have not found what this chemical rebuilding is.

A race which does without sleep, however, is well on the road to a race of mentally disordered people, probably within the first generation, for sleep is not merely a great restorative, but its dreams are often a safety valve for sanity. So when such a pill appears, if ever, I would warn you still to take no substitute for real sleep, lots of it, under the best conditions, and dream pleasantly to your heart's content.

Science News-Letter, June 9, 1928

High Speed Not Harmful

Aviation

By Thomas Carroll,

Mr. Carroll is chief test pilot of the National Advisory Committee for Aeronautics.

High speeds "nearing the limit of endurance of human body" are being frequently reported in aviation. Automobile speed tests also give rise to similar expressions.

Anything over two hundred miles an hour seems sufficient to excite the phrase. And it would be just as untrue if the speed were a thousand miles an hour as though it were twenty-five.

Speed itself has no effect whatever. At least we have found none at three hundred miles an hour. True, if parts of the human body are exposed to the direct wind of such speedy passage unpleasant consequences must be expected. But this is not in contemplation, for the person attaining these speeds is carefully shielded from the wind.

There is no doubt that the human body would not stand such speeds were they shot from a gun or from a catapult, but in any ordinary means of flight or locomotion there is no element of acceleration comparable to that.

The human body does not stand acceleration well. This is well known and proven. Rapid acceleration or deceleration drives or draws the blood away from the nerve centers producing momentary blindness or other malfunction of the body. But fortunately, it is almost impossible to continue the force for more than a moment and the after-effects seem to be conspicuous by their absence. The first symptoms of the effect appear in an amber tinting of the vision, as though you had clapped on a pair of amber glasses, followed, if the acceleration is maintained, by darkness. The recovery is rapid and complete.

The effects are made negligible by either of two extremely simple means, by wearing a corset-like belt such as is worn by polo players, or simpler still, by letting out a good lusty yell.

Science News-Letter, June 9, 1928

An anonymous philanthropist has promised the University of California $5,000 a year for the rest of his life to be used in studying the prevention of children's diseases.

A carload of 300,000 insect specimens collected in the Malay Archipelago during 15 years has reached the Smithsonian Institution at Washington.

Nature Ramblings

By Frank Thone

Natural History

Scarlet Tanager

If you hear something that sounds very much like a robin's song, but punctuated with a frequent "chip-churr," it is the scarlet tanager you are listening to. He should not be difficult to see, either, for he is as conspicuous as a Kentucky cardinal, though his red is of a slightly different shade. There is no reason for confusing him with a cardinal, however, for he has no crest, and his wings and tail are black. It is really a most striking uniform, worthy of the brave days of the eighteenth century, when regiments were as brilliant as the poppy fields they deployed in.

The tanager, however, sports his grenadier coat only while he is courting, and during the early days of his family responsibilities. After that he sheds it and takes on a sober civilian suit of olive green, to match his wife's dress; for unlike the cardinal's mate the female tanager is not privileged to sport a brilliant turnout of her own.

Tanagers are found only in well-wooded places. They are not the neighborly suburban burghers that robins are. They are not hermits, though, and will make their nests in parks and on large estates where there is plenty of timber. They are especially fond of oaks.

The range of the scarlet tanager is wide enough so that most of us can have a chance to see the bird if we seek him with patience and a discreet quietness. It covers all of eastern North America, and the winter migration grounds extend as far as northern South America.

Science News-Letter, June 9, 1928

Of the 5,000 paintings on exhibition in the Louvre in Paris, about 100 have been pronounced frauds, following elaborate X-rays and spectograph studies.

Helpfulness Among Animals

Zoology

JAMES H. LEUBA in *Morality Among The Animals* (Harpers Magazine):

A chimpanzee's burst of affectionate concern in the presence of a suffering fellow-creature, especially when small and weak, would put to shame the callous indifference of many a human being. One of the younger and smaller apes of Professor Köhler's, Konsul by name, was sick. He had just been let out of the infirmary and was dragging himself painfully towards his fellows, engaged in eating green fodder some distance away. After a few steps his strength gave out and he fell to the ground uttering a piercing cry. Tercera, a female ape, chewing nearby, sprang up in great excitement, uttering cries of distress, and reached Konsul in a few strides. She caught hold of him under the arms, trying to set him on his feet, her face expressive of the utmost concern. The witness of this scene adds, "One could not imagine anything more maternal than this female chimpanzee's behavior."

These apes befriended and helped one another in all sorts of circumstances. When one was being punished the others showed not only passive sympathy, but they sought to stop the punishment. Little Konsul, whom I have just mentioned, would run up excitedly and, with a pleading countenance, stretch out his arms to the punisher. He would even try to hold his arm tight; and if the chastisement continued, growing exasperated, he would hit out at the big man!

Apes excepted, it is probably among elephants, of all mammals, that mutual helpfulness is best developed. When an elephant is wounded by a bullet others have frequently been observed to come to its help and support it. If it falls some of its fellows will kneel by its side, pass their tusks under its body, while others wind their trunks about its neck in an attempt to put the wounded animal on its feet.

Science News-Letter, June 9, 1928

A recent study of college students shows that one of the chief causes of failure in college is inability to read.

Carbon monoxide last year killed some 700 automobile drivers who allowed their motors to idle in closed garages.

The course of an underground stream in England was traced for eight miles by placing coloring matter in the water where an opening occurred.

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Fact vs. Opinion

Psychology

GUY M. WHIPPLE, in *How to Study Effectively* (Public School Pub. Co.):

Seek always to distinguish between facts and opinions.

Another way in which the critical attitude can be exercised is in seeking to keep clear, as you read, the difference between statements of established facts and statements of opinions. Sometimes this distinction is easily made. If the author says: "The great wall of China, built 200 B. C., was 1,250 miles in length, 20 feet high, and 25 feet thick at the base," it is clear that you are confronted with a factual statement. If he says: "It is thought that several million men were probably occupied for the space of ten years on its construction," it is clear that you are confronted with an opinion. Statements may sometimes seem at first blush to be definite statements of fact, but a more careful reading will show that they are, after all, only statements of opinion. For example, a writer in Johnson's *Universal Encyclopedia*, discussing the dynamo in 1881, said: "It has long since been regarded as settled that motive-power derived from electro-magnetic combinations can only be secured at an expense which forbids its employment on a large scale." Here, the phrases "long since" and "settled" make the statement sound like the statement of an assured fact, but no doubt the man who wrote it has since then been transported many miles on electric cars powered by an "electro-magnetic combination." The statement was only an opinion, and a rather poor one at that.

Students cannot avoid being thus confronted with hundreds of statements, especially in such fields as politics, economics, the social sciences, and religion, some of which are statements of fact, but many of which are statements of opinion. The good student will do well to cultivate the habit of trying to disentangle mere opinions from established facts. The capacity to do this is greatly needed in present-day life.

Science News Letter, June 9, 1928

Before 1700, the average number of children in an American family was double what it is today.

A duck hospital for ailing ducks was established recently by California's fish and game department.

In the factories of Shanghai there are 103,000 girls and 44,000 boys under 13 years of age at work.

FIRST GLANCES AT NEW BOOKS

POSSIBLE WORLDS—J. B. S. Haldane—*Harper* ($2.50). The aim of this volume of miscellaneous articles is expressed by the author as follows:

"Many scientific workers believe that they should confine their publications to learned journals. I think, however, that the public has a right to know what is going on inside the laboratories, for some of which it pays. And it seems to me vitally important that the scientific point of view should be applied, so far as is possible, to politics and religion. In such spheres the scientific man cannot, of course, speak with the same authority as when he is describing the results of research; and in so far as he is scientific he must try to suppress such of his own views as have no more scientific backing than those of the man in the street."

Haldane is the Huxley of our time. He differs from most men of science in having the ability to write interestingly on any subject and in his willingness to let loose his imagination a little on the possibilities of the future. Few of the new books will give the reader so many fresh ideas. In religion he is a skeptic but not a materialist. His antagonism to the church he ascribes largely to the conduct of the clergy in the late war.

General Science
Science News-Letter, June 9, 1928

CHRISTIANITY IN SCIENCE—Frederick D. Leete—*Abingdon* ($3). A useful contribution to the current controversy, particularly because of the wide range of citations of the views of men of science on theological questions in and on the meaning of science. The author is unusually careful in his quotations and does not force their meaning to fit his own ideas or attempt to cover a fundamental divergence by a specious verbal agreement. Preachers who are skeptical of the value of science and fearful of its advance would profit by the perusal of the chapters on "The Spirit and Service of Science" and "Heroes and Martyrs of Science."

General Science
Science News-Letter, June 9, 1928

KREBS UND SEINE WAHRE URSACHE—J. Winkelhagen—*Bruckmann.* The author sets forth his theory of the cause of cancer in a 75-page brochure. He is of the opinion that the fundamental cause of the disease is to be sought in changes in the blood.

Pathology
Science News-Letter, June 9, 1928

THE KINGDOM OF THE MIND—June E. Downey—*Macmillan* ($2). At last—psychology for the high school age, or even for the bright child of the seventh or eighth grade. The book is addressed pointedly to the boy reader, and the style is accordingly simple and lively. "How fast can you read to yourself?" demands the psychologist. "How fast can you write?" "Where is the blind spot in your eye?" Dr. Downey ingeniously contrives to drive home a good many fundamental points of psychological science, and her book deserves a place on the bookshelf of the modern boy and girl.

Psychology
Science News-Letter, June 9, 1928

PICTURE VALUES IN EDUCATION—Joseph J. Weber—*Educational Screen.* The important part that pictures can play in education is recognized, but how pictures can best be used is not so well understood. This monograph reports an experimental investigation in which the merits of prints, textbook illustrations, lantern slides and stereographs were compared and analyzed.

Pedagogy
Science News-Letter, June 9, 1928

THE NEW INTERNATIONAL YEAR BOOK; 1927 — Edited by Herbert Treadwell Wade—*Dodd, Mead.* In this, the twenty-sixth issue of the year-book, the plan of preceding years is followed to make a valuable work for anyone who desires a complete summary of the achievements of the world during the past year. Arranged alphabetically by subjects, it forms a veritable encyclopedia of 1927, while a well qualified staff of contributors, as well as the reputation of the work, lend it a considerable degree of authority.

General Science
Science News-Letter, June 9, 1928

PATENT LAW FOR THE INVENTOR AND EXECUTIVE—H. A. Toulmin, Jr.—*Harper* ($4). Do you have some gimcrack that you want to patent? Do you know what the law is? Do you know how the Sherman anti-trust law forbidding monopolies can be reconciled with the patent law which grants it? If you have ever invented, or are inventing, or expect to invent something, you will find this book extremely valuable.

Invention
Science News-Letter, June 9, 1928

ARCHIMEDES—L. L. Whyte—*Dutton* ($1). One man's idea of the future of physics. In the study of light, and its relation to life and consciousness, lies the way in which physics may in the future "create a new hope for man." The book is another of the stimulating "Today and Tomorrow Series."

Physics
Science News-Letter, June 9, 1928

METEOROLOGY—David Brunt—*Oxford* ($1). A concise introduction to the science of the weather. Though written by an Englishman, for British circulation, and therefore dealing particularly with conditions on the British Isles, the general facts are, of course, suitable for the entire world.

Meteorology
Science News-Letter, June 9, 1928

OLD MOTHER EARTH—Kirtley F. MATHER—*Harvard Univ. Pr.* ($2.50). An excellently well-worked-out popular presentation of historical geology, with simple, clear illustrations. A veteran of the Battle of Dayton, Prof. Mather takes especial pains with the vexed questions of evolution and the interpretation of Genesis.

Geology
Science News-Letter, June 9, 1928

THE ROAD TO PLENTY—William T. Foster and Waddill Catchings—*Houghton Mifflin.* A really readable discussion of the question of unemployment and over-production arriving at a plausible and practical plan for preventing business crises. In the form of Pullman car conversations between a Professor, a Business Man, a Congressman, a Lawyer, a Sure-Fire Salesman, a Red-Haired Orator and a Gray Man.

Sociology
Science News-Letter, June 9, 1928

URBAN LAND ECONOMICS—H. B. Dorau and A. G. Hinman—*Macmillan.* A compactly written, searching inquiry into the increasingly complex problems presented by modern city growth.

Economics
Science News-Letter, June 9, 1928

THE ECONOMIC WORLD—A. R. Burns and Eveline M. Burns—*Oxford Press* ($2). A condensed presentation of the main outlines of economics, suitable for use as an elementary textbook or for home study.

Economics
Science News-Letter, June 9, 1928

A Statement of Purpose

(The aims, ideals and aspirations of an institution)

SCIENCE SERVICE is a unique institution, established at Washington for the purpose of disseminating scientific information to the public. It aims to act as a sort of liaison agency between scientific circles and the world at large. It interprets original research and reports the meetings of learned societies in a way to enlighten the layman. The specialist is likewise a layman in every science except his own and he, too, needs to have new things explained to him in non-technical language. Scientific progress is so rapid and revolutionary nowadays that no one can keep up with it from what he learned at school. Science Service endeavors to provide life-continuation courses in all the sciences for newspaper readers anywhere in America without tuition fees or entrance examinations.

In a democracy like ours it is particularly important that the people as a whole should so far as possible understand the aims and achievements of modern science, not only because of the value of such knowledge to themselves but because research directly or indirectly depends upon popular appreciation of its methods. In fact the success of democratic institutions, as well as the prosperity of the individual, may be said to depend upon the ability of people to distinguish between science and fakes, between the genuine expert and the pretender.

Science Service spares no pains or expense in the endeavor (1) to get the best possible quality of popular science writing and (2) to get it to the largest possible number of readers. If in doing this it can make both ends meet, so much the better. If not, it will do it anyway.

Through the generosity of E. W. Scripps, Science Service has been assured of such financial support as to insure its independence and permanence. Mr. Scripps's long and wide experience as a newspaper editor and proprietor had convinced him of the importance of scientific research as the foundation of the prosperity of the nation and as guide to sound thinking and living and he realized the need for an independent agency that would bring the results of research to the attention of the entire people so these could be applied to the solution of their personal, social or political problems.

Science Service is chartered as a non-profit-making institution and all receipts from articles, books, lectures and films are devoted to opening up new avenues for the diffusion of knowledge and developing promising methods of popular education. Although Science Service has a philanthropic purpose, it is conducted on business principles, with the aim of making each branch of its activities ultimately self-supporting so far as possible. All acceptable contributions are paid for and all published articles are charged for.

Science Service is under the control of a Board of Trustees composed of ten scientists and five journalists. The leading national organizations of all the sciences, the National Academy of Sciences, the National Research Council, and the American Association for the Advancement of Science, appoint three trustees each.

Science Service occupies offices in the magnificent new building of the National Academy of Sciences and the National Research Council on Potomac Park opposite the Lincoln Memorial.

This strategic situation enables the Service to keep constantly in touch with the progress of the sciences because new inventions and discoveries are promptly put on exhibition in the building, and the Council brings together investigators in the various sciences and leaders in engineering and industry from all parts of the country.

Science Service is not a governmental institution, but it is in close contact with the numerous governmental bureaus of research. It is not under the control of any clique, class or commercial interest. It is not the organ of any single scientific association. It serves all the sciences. It engages in no propaganda, unless it be called propaganda to urge the value of research and the usefulness of science.

Science Service began its work on January 1, 1921, and has now a sizable office staff with a large corps of contributors in the chief research institutions of this country and Europe.